



Version with Markings for Specification

Application Serial No. 09/434,985

Filed 11/5/1999

LOW NOISE FULL INTEGRATED MULTILAYER[[S]] MAGNETIC FOR POWER CONVERTERS

OK
for entry
JWW 4/28/05

Related Applications

This is a continuation of United States Patent application serial number 08/351,943, filed 5 on December 8, 1994, and entitled "Low Noise Full Integrated Multilayer Magnetic for Power converters[[]]," incorporated herein by reference.

Field of the Invention

This invention relates to DC-to-DC converters, DC-to-AC, AC-to-AC and AC-to-DC converters. The major characteristics of this power conversion technique is are that all the 10 magnetic elements are implemented on the same multilayer[[s]] structure, and the power transfer is made highly efficient and by minimizing the common mode noise is minimized.

Background of the Invention

There is a continuing industry demand for increasing power density, which means more power transferred in a given volume. A method for increasing the power transfer through the 15 converter is to increase the switching frequency in order to minimize the size of magnetic magnetics and the capacitors. Using prior art topologies such as forward or flyback, which employ "hard" switching techniques, makes high frequency operation less efficient. The switching losses associated with switch elements, which turn on when there is a voltage across them, are proportional with the switching frequency. An increase in switching frequency leads 20 to an increase in switching losses and an increase in level of electromagnetic interference (EMI).

In order to overcome limitations in switching speeds, the prior art has devised a new family of resonant and quasi-resonant converters. In the case of quasi-resonant converters, the prior art technique consists of shaping the current or voltage to become half-sinusoidal and to perform the switching when the current or voltage reaches zero. The reactive elements, which 25 contribute to shaping the current or voltage, are part of the basic circuit and are considered undesirable in classic topologies. An example of one such circuit can be found in Vinciarelli,